

# Annual Report 2009



## Production Sector

### Company Information

Company Name: Hunt Oil Company  
Gas STAR Contact: Martin Wouch  
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### Annual Report Summary

- ☐ BMP 1: Identify and replace high-bleed pneumatic devices  
☐ BMP 2: Install flash tank separators on glycol dehydrators  
☒ Partner Reported Opportunities (*please specify*):  
Install gas lift on one well; Decommission one gas-fired compressor  
engine; DI&M for tanks at field production facilities

Period covered by report: From: Jan. 1, 2009 To: Dec. 31, 2009

Partner Signature Required:

I hereby certify the accuracy of the data contained in this report.

*Mat Wouch*

*7/30/2010*

Date

- Because the implementation of some technologies reduces emissions for multiple years, Natural Gas STAR allows certain activities to count towards a company's emission reductions beyond the initial year of implementation. Natural Gas STAR designates the maximum length of time that these reductions may accrue as "sunset dates." The Appendix lists these sunset dates. Companies can report the corresponding methane emission reductions each year up to the allowable sunset date. Or, companies may wish to report reductions only once for the implementation year, and have EPA automatically apply the sunset date and count those emissions for the allowable number of years.
- In addition to reporting methane emissions reductions, you are welcome to include other information about your company's participation in Natural Gas STAR in the "Additional Program Accomplishments" section of this form. The Natural Gas STAR Program will use any information entered in this section to recognize the efforts and accomplishments of outstanding partners.



## Production Sector Annual Report

OMB Control No. 2060-0328  
Expires 07/31/2011

### BMP 1: Identify and Replace High-Bleed Pneumatic Devices

#### Current Year Activities

**A. Facility/location identifier information:** *Not applicable to Reporting Year 2009*

**B. Facility summary:**

Number of devices replaced: \_\_\_\_\_ devices

Percent of system now equipped with  
low/no-bleed units: \_\_\_\_\_ %

**C. Cost summary:**

Estimated cost per replacement  
(including equipment and labor): \$ \_\_\_\_\_ /replacement

**D. Methane emissions reduction:** \_\_\_\_\_ Mcf

**E. Are these emissions reductions a one-year reduction or a multi-year reduction?** ☐ One-year ☐ Multi-year

**If Multi-year:**

☐ Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration (BMP 1 has a sunset period of 7 years).

☐ Partner will report this activity annually up to allowed sunset date.

*Please identify the basis for the emissions reduction estimate, using the space provided to show any calculations*

☐ Standard calculation

*Methane emissions reduction = [Annual emissions from high-bleed devices being replaced (in Mcf/yr) - Annual emissions for the replacement devices (in Mcf/yr)] x Number of devices replaced*

*Please specify your data source:*

- ☐ Field measurement
- ☐ Manufacturer specifications

☐ Calculation using default

*Methane emissions reduction = 124 Mcf/yr x Number of devices replaced*

☐ Other (please specify):

*For assistance quantifying the methane emission reductions achieved by BMP 1, please refer to the Natural Gas STAR Emission Reduction Quantification Reference Guide, available on our Web site at: [epa.gov/gasstar/documents/xls/quantifying\\_ngs\\_methane\\_reductions.xls](http://epa.gov/gasstar/documents/xls/quantifying_ngs_methane_reductions.xls)*

**F. Total value of gas saved:** \$ \_\_\_\_\_

*Total value of gas saved = Methane emissions reduction (in Mcf) x Gas value (in \$/Mcf) [If not known, use default of \$7.00/Mcf]*

**G. How many high-bleed devices do you plan to replace next year?** \_\_\_\_\_ devices

#### Previous Years' Activities

*Use the table below to report any past activities implemented, but not previously reported to the Natural Gas STAR Program*

Year	# Devices Replaced	Total Cost of Replacements (incl. equipment and labor) (\$)	Estimated Reductions (Mcf/yr)	Value of Gas Saved (\$)

**BMP 1 Comments:** *Please use the back of the page for additional space if needed.*



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### BMP 2: Install Flash Tank Separators on Glycol Dehydrators

#### Current Year Activities

**A. Facility/location identifier information:** *Reported previously for automatic inclusion by EPA*

**B. Facility summary:**

Number of flash tank separators installed: \_\_\_\_\_ separators

Percent of dehydrators in system equipped with flash tank separators: \_\_\_\_\_ %

**C. Cost summary:**

Estimated cost per flash tank separator installation (including equipment and labor): \$ \_\_\_\_\_ /installation

**D. Methane emissions reduction:** \_\_\_\_\_ Mcf

**E. Are these emissions reductions a one-year reduction or a multi-year reduction?** ☐ One-year ☐ Multi-year

**If Multi-year:**

☐ Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration (BMP 2 has a sunset period of 10 years).

☐ Partner will report this activity annually up to allowed sunset date.

**Please identify the basis for the emissions reduction estimate, using the space provided to show any calculations**

☐ Standard calculation

*Methane emissions reduction per flash tank installation = [TEG circulation rate (in gal/hr) x Methane entrainment rate (in scf/gal)\* x hours of operation (in hrs/yr) x 0.90] / 1,000*

*\*If methane entrainment rate is not known, use a default value of 3 scf/gal for energy exchange pumps or 1 scf/gal for electric pumps*

*Please specify your data source:*

- ☐ Field measurement  
☐ Manufacturer specifications

☐ Calculation using default

*Methane emissions reduction = [Average gas throughput (in MMcf/yr) x 170 scf/MMcf x 0.90] / 1,000*

☐ Other (please specify):

*For assistance quantifying the methane emission reductions achieved by BMP 2, please refer to the Natural Gas STAR Emission Reduction Quantification Reference Guide, available on our Web site at: [epa.gov/gasstar/documents/xls/quantifying\\_ngs\\_methane\\_reductions.xls](http://epa.gov/gasstar/documents/xls/quantifying_ngs_methane_reductions.xls)*

**F. Total value of gas saved:** \$ \_\_\_\_\_

*Total value of gas saved= Methane emissions reduction (in Mcf) x Gas value (in \$/Mcf) [If not known, use default of \$7.00/Mcf]*

**G. How many flash tank separators do you plan to install next year?** \_\_\_\_\_ flash tank separators

#### Previous Years' Activities

*Use the table below to report any past activities implemented, but not previously reported to the Natural Gas STAR Program*

Year	# Flash Tank Separators Installed	Total Cost of Installation (incl. equipment and labor) (\$)	Estimated Reductions (Mcf/yr)	Value of Gas Saved (\$)

**BMP 2 Comments:** *Please use the back of the page for additional space if needed.*



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### Partner Reported Opportunities (PROs)

For more details on PROs, visit [epa.gov/gasstar/tools/recommended.html](http://epa.gov/gasstar/tools/recommended.html)

### Current Year Activities

**A. Facility/location identifier information:** *PRO-3.2009 Fairway Field Facilities (continuation from 2008 with additional units in 2009)*

**B. Activity description:** Please provide a separate PRO reporting form for each activity reported. If reporting a DI&M activity, please use a separate page for each location/facility surveyed.

Please specify the technology or practice that was implemented (choose from the list in the appendix or describe your own):

Artificial lift installed on well.

Please describe how your company implemented this activity:

Replaced natural flow with gas lift.

**C. Level of Implementation** (check one):

- ☒ Number of units installed: 1 units  
☐ Frequency of practice: times/year

**D. Are emissions reductions a one-year reduction or a multi-year reduction?** ☐ One-year ☒ Multi-year

**If Multi-year:**

☒ Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration\*.

☐ Partner will report this activity annually up to allowed sunset date.

**E. Methane emissions reduction:** 1045 Mcf

**F. Cost summary:** Estimated cost of implementing this practice/activity (including equipment and labor): \$ 15,000

*Please identify the basis for the emissions reduction estimate, using the space provided to show any calculations*

- ☐ Actual field measurement  
☐ Calculation using manufacturer specifications/other source

☒ Other (please specify): See Attachment

For assistance quantifying the methane emission reductions achieved by a particular technology or practice, please refer to the Natural Gas STAR Emission Reduction Quantification Reference Guide, available on our Web site at: [epa.gov/gasstar/documents/xls/quantifying\\_ngo\\_methane\\_reductions.xls](http://epa.gov/gasstar/documents/xls/quantifying_ngo_methane_reductions.xls)

**G. Total value of gas saved:** \$ 7,315

Total value of gas saved = Methane emissions reduction (in Mcf)  
x Gas value (in \$/Mcf) [If not known, use default of \$7.00/Mcf] Used \$7/Mcf

**H. To what extent do you expect to implement this practice next year?**  
Limited - to be determined on well-by-well basis

### Previous Years' Activities

Use the table below to report any past implementation of this PRO, but not previously reported to Natural Gas STAR

Year	Frequency of Practice/Activity or # of Installations	Total Cost of Practice/Activity (incl. equipment and labor) (\$)	Estimated Reductions (Mcf/yr)	Value of Gas Saved (\$)

**PRO Comments:** Please use the back of the page for additional space if needed.

\*Because the implementation of some technologies reduces emissions for multiple years, Natural Gas STAR allows certain activities to count towards a company's emission reductions beyond the initial year of implementation. Natural Gas STAR designates the maximum length of time that these reductions may accrue as "sunset dates." The Appendix lists these sunset dates. Companies can report the corresponding methane emission reductions each year up to the allowable sunset date. Or, companies may wish to report reductions only once for the implementation year, and have EPA automatically apply the sunset date and count those emissions for the allowable number of years.



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### Partner Reported Opportunities (PROs)

For more details on PROs, visit [epa.gov/gasstar/tools/recommended.html](http://epa.gov/gasstar/tools/recommended.html)

### Current Year Activities

**A. Facility/location identifier information:** PRO-5 Fairway Gas Plant

**B. Activity description:** Please provide a separate PRO reporting form for each activity reported. If reporting a DI&M activity, please use a separate page for each location/facility surveyed.

Please specify the technology or practice that was implemented (choose from the list in the appendix or describe your own):

Eliminate unnecessary equipment and/or systems.

Please describe how your company implemented this activity:

Eliminate compressor and route gas to production field facilities.

**C. Level of Implementation** (check one):

- ☒ Number of units installed: 1 units  
☐ Frequency of practice: times/year

**D. Are emissions reductions a one-year reduction or a multi-year reduction?** ☐ One-year ☒ Multi-year

**If Multi-year:**

☒ Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration\*.

☐ Partner will report this activity annually up to allowed sunset date.

**E. Methane emissions reduction:** 1857 Mcf

**F. Cost summary:** Estimated cost of implementing this practice/activity (including equipment and labor): \$ 1000

**Please identify the basis for the emissions reduction estimate, using the space provided to show any calculations**

- ☐ Actual field measurement ☒ Other (please specify): See Attachment  
☐ Calculation using manufacturer specifications/other source

For assistance quantifying the methane emission reductions achieved by a particular technology or practice, please refer to the Natural Gas STAR Emission Reduction Quantification Reference Guide, available on our Web site at: [epa.gov/gasstar/documents/xls/quantifying\\_ngs\\_methane\\_reductions.xls](http://epa.gov/gasstar/documents/xls/quantifying_ngs_methane_reductions.xls)

**G. Total value of gas saved:** \$ 12,999

Total value of gas saved = Methane emissions reduction (in Mcf)  
x Gas value (in \$/Mcf) [If not known, use default of \$7.00/Mcf] Used \$7/Mcf

**H. To what extent do you expect to implement this practice next year?**

**Limited – to be determined based on production and processing needs**

### Previous Years' Activities

Use the table below to report any past implementation of this PRO, but not previously reported to Natural Gas STAR

Year	Frequency of Practice/Activity or # of Installations	Total Cost of Practice/Activity (incl. equipment and labor) (\$)	Estimated Reductions (Mcf/yr)	Value of Gas Saved (\$)

**PRO Comments:** Please use the back of the page for additional space if needed.

\*Because the implementation of some technologies reduces emissions for multiple years, Natural Gas STAR allows certain activities to count towards a company's emission reductions beyond the initial year of implementation. Natural Gas STAR designates the maximum length of time that these reductions may accrue as "sunset dates." The Appendix lists these sunset dates. Companies can report the corresponding methane emission reductions each year up to the allowable sunset date. Or, companies may wish to report reductions only once for the implementation year, and have EPA automatically apply the sunset date and count those emissions for the allowable number of years.



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### Partner Reported Opportunities (PROs)

For more details on PROs, visit [epa.gov/gasstar/tools/recommended.html](http://epa.gov/gasstar/tools/recommended.html)

### Current Year Activities

**A. Facility/location identifier information:** PRO-6 Fairway Field Facilities

**B. Activity description:** Please provide a separate PRO reporting form for each activity reported. If reporting a DI&M activity, please use a separate page for each location/facility surveyed.

Please specify the technology or practice that was implemented (choose from the list in the appendix or describe your own):

Directed inspection and maintenance (DI&M) of storage tank hatches.

Please describe how your company implemented this activity:

Inspect hatches visually and with FLR camera. Replaced leaking hatch gaskets. Later began replacing hatches when gasket life was shorter than expected.

**C. Level of Implementation** (check one):

- ☒ Number of units installed: 10 units  
☐ Frequency of practice: times/year

**D. Are emissions reductions a one-year reduction or a multi-year reduction?** ☐ One-year ☒ Multi-year

**If Multi-year:**

☒ Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration\*.

☐ Partner will report this activity annually up to allowed sunset date.

**E. Methane emissions reduction:** 457 Mcf

**F. Cost summary:** Estimated cost of implementing this practice/activity (including equipment and labor): \$ 3,000

**Please identify the basis for the emissions reduction estimate, using the space provided to show any calculations**

- ☐ Actual field measurement ☒ Other (please specify): See Attachment  
☐ Calculation using manufacturer specifications/other source

For assistance quantifying the methane emission reductions achieved by a particular technology or practice, please refer to the Natural Gas STAR Emission Reduction Quantification Reference Guide, available on our Web site at:  
[epa.gov/gasstar/documents/xls/quantifying\\_ngs\\_methane\\_reductions.xls](http://epa.gov/gasstar/documents/xls/quantifying_ngs_methane_reductions.xls)

**G. Total value of gas saved:** \$ 3199

Total value of gas saved = Methane emissions reduction (in Mcf)  
x Gas value (in \$/Mcf) [If not known, use default of \$7.00/Mcf] Used \$7/Mcf

**H. To what extent do you expect to implement this practice next year?**

Continue DI&M on tanks at Fairway field facilities.

### Previous Years' Activities

Use the table below to report any past implementation of this PRO, but not previously reported to Natural Gas STAR

Year	Frequency of Practice/Activity or # of Installations	Total Cost of Practice/Activity (incl. equipment and labor) (\$)	Estimated Reductions (Mcf/yr)	Value of Gas Saved (\$)

**PRO Comments:** Please use the back of the page for additional space if needed.

\*Because the implementation of some technologies reduces emissions for multiple years, Natural Gas STAR allows certain activities to count towards a company's emission reductions beyond the initial year of implementation. Natural Gas STAR designates the maximum length of time that these reductions may accrue as "sunset dates." The Appendix lists these sunset dates. Companies can report the corresponding methane emission reductions each year up to the allowable sunset date. Or, companies may wish to report reductions only once for the implementation year, and have EPA automatically apply the sunset date and count those emissions for the allowable number of years.



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### Additional Program Accomplishments

The Natural Gas STAR Program will use any information entered here to recognize the efforts and achievements of outstanding partners.

Please include any additional information you would like to share about your company's participation in Natural Gas STAR. Examples may include:

- Activities to strengthen your program (e.g., training/education, innovative technologies or activities, pilot projects, employee incentive programs).
- Efforts to communicate your participation and successes (e.g., internal newsletters, press releases, company Web site).
- Participation in Natural Gas STAR program activities (e.g., contributions to case studies, presentation at annual workshop).

#### Additional Accomplishments:

The following programs were implemented for regulatory reasons and are, therefore, not included in the STAR reporting:

- FLR camera monitoring of rented compressor engines at Fairway Field Facilities
- Catalytic converter and air/fuel ratio controller added to a compressor engine at Fairway Gas Plant



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### Appendix

#### Methane Emission Reduction Technologies & Practices— Production Sector

The list below describes a variety of methane emission reduction technologies that Natural Gas STAR partners in the production sector have implemented and reported to Natural Gas STAR. You may use this list as a guide when completing your annual report. ***Sunset dates (i.e., the length of time a technology or practice can continue to accrue emission reductions after implemented) are one year in duration unless otherwise noted in parentheses.*** An asterisk (\*) indicates that a technical document related to the technology or practice is available online at [epa.gov/gasstar/tools/recommended.html](http://epa.gov/gasstar/tools/recommended.html).

##### Compressors/Engines

- Automate compressor systems operation to reduce venting\*
- Catalytic converter installation (10 years)
- Convert engine starting to nitrogen and/or CO<sub>2</sub> rich gas (10 years)\*
- Convert to low pressure compressor starters (10 years)
- Eliminate unnecessary equipment and/or systems\*
- Increase compression capacity to reduce venting/flaring
- Install automated air/fuel ratio control systems (10 years)\*
- Install electric compressors (10 years)\*
- Install electric motors (10 years)
- Install electric starters (10 years)\*
- Install lean burn compressor (10 years)
- Lower compressor purge pressure for shutdown\*
- Redesign blowdown/alter ESD practices\*
- Reduce emissions when taking compressors offline\*
- Replace compressor rod packing systems\*
- Replace gas starters with air (10 years)\*
- Replace ignition/reduce false starts\*
- Turbine fuel use optimization

##### Dehydrators

- Install condensers on glycol dehydrators (10 years)
- Install/convert gas-driven chemical pumps to electric, mechanical, or solar pumps (10 years)\*
- Install desiccant dehydrator (10 years)\*
- Reduce glycol circulation rates in dehydrators\*
- Reroute dehy./tank vents to flare or station suction (10 years)\*
- Reroute glycol skimmer gas\*
- Shutdown glycol dehydrator stripping gas in winter
- Use rich glycol in glycol pumps

##### Directed Inspection and Maintenance

- DI&M at compressor stations\*
- DI&M: leak detection using IR camera/optical imaging
- DI&M: leak detection using lower emission threshold
- DI&M: survey and repair leaks

##### Pipelines

- Inject blowdown gas into low pressure system\*
- Pipeline replacement and repair
- Use fixed/portable compressors for pipeline pumpdown\*
- Use hot taps for in-service pipeline connections\*

##### Pneumatics/Controls

- Capture/use gas released from gas-operated pneumatic pumps
- Convert gas-driven chemical pumps to instrument air (10 years)\*
- Convert gas pneumatic controls to instrument air (10 years)\*
- Convert gas pneumatic controls to mechanical controls (10 years)\*
- Install/convert gas powered separators to solar separators (10 years)
- Install controllers on gas-assisted methanol pump (10 years)
- Install no bleed controllers (10 years)
- Install non-venting dump controllers (10 years)
- Reduce gas pressure on pneumatic devices
- Reduce venting from unlit pilot: install electronic safety devices (10 years)\*
- Replace bi-directional orifice meter with ultrasonic meters\*
- Replace chemical pumps with electronic flow controllers (10 years)
- Use add-on controls to reduce emissions from pneumatics (10 years)

##### Tanks

- Change out vent pallet (10 years)
- Consolidate crude oil production and water storage tanks (10 years)\*
- Convert water tank blanket from natural gas to CO<sub>2</sub> (10 years)\*
- Install evactors (10 years)
- Install flash gas compressors (10 years)
- Install hydrocarbon liquid stabilizer (10 years)



## Appendix (continued)

### Tanks

- Install pressurized storage of condensate (10 years)\*
- Install vapor recovery units (VRUs) (10 years)\*
- Install vapor recovery units on pipeline liquid/condensate tanks (10 years)\*
- Recycle line recover gas during condensate loading\*
- Reduce excess blanket gas blow-by to the atmosphere
- Replace leaking aboveground tanks (10 years)
- Use protective tank coatings to reduce leaks (10 years)

### Valves

- Heat tracing to prevent control valves from freezing open
- Install plugs on valves and open ended lines (10 years)
- Reduce venting from unlit pilot: install BASO valves (10 years)\*
- Test and repair pressure safety valves\*

### Wells

- Artificial lift: gas lift (10 years)
- Artificial lift: install plunger lifts (10 years)\*
- Artificial lift: install pumpjacks or rod pumps on gas wells (10 years)\*
- Artificial lift: install smart lift automated systems on gas wells (10 years)\*
- Artificial lift: install velocity tubing strings (10 years)\*
- Artificial lift: pressure swabbing
- Artificial lift: use capillary strings (10 years)
- Artificial lift: use compression (10 years)
- Artificial lift: use pumping unit (10 years)

- Artificial lift: use to reduce blowdown in gas wells (10 years)\*
- Install automated shut-in cycle units to reduce well venting (10 years)
- Install flash tank separator on water gathering system (10 years)
- Install pumps for separators (10 years)
- Install snubbing unit at wellhead
- Install soap launcher/soap unit (10 years)
- Lower heater-treater temperature\*
- Optimize gas well unloading times\*
- Perform reduced emissions completions\*
- Route casinghead gas to VRU or compressor (10 years)\*
- Use foaming agents to reduce blowdown frequency\*

### Other

- Capture and use waste heat to reduce gas usage and emissions
- Convert natural gas fired generator to solar power (10 years)
- Flare reduction program
- Improve system design/operation
- Install flares (10 years)\*
- Install purge reducer on flare (10 years)
- Install pilotless burner controls (10 years)
- Optimize nitrogen rejection unit to reduce methane in N<sub>2</sub> reject stream\*
- Recover gas from separators
- Re-inject gas for enhanced oil recovery
- Re-inject gas into crude
- Replace aged heaters with new efficient gas fired heaters (10 years)

### Mailing Information:

#### Standard Mail:

The Natural Gas STAR Program  
U.S. EPA (6207J)  
1200 Pennsylvania Ave, NW  
Washington, DC 20460  
U.S.A.

#### Express/Overnight Mail:

The Natural Gas STAR Program  
U.S. EPA (6207J)  
1310 L Street, NW  
Washington, DC 20005  
U.S.A.

The public reporting and recordkeeping burden for this collection of information is estimated to average 60 hours for each new response and 27 hours for subsequent responses. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.



## **Production Sector Annual Report**

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# **ATTACHMENT**



## Production Sector Annual Report

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### EMISSION CALCULATION METHODS

Methods based on Methane Emissions Quantification Methods memo dated April 2, 2009 from Carey Bylin of EPA and sources available on EPA Natural Gas STAR website.

**Note:** PRO-1 through PRO-4 reported for Reporting Year 2008. PRO-3.2009 is a continuation of PRO-3, indicating the number of additional units was included for Reporting Year 2009.

#### **PRO-3.2009: Artificial Lift**

**2009: 1 additional well put on gas lift**

##### **Gas Lift**

Calculate emissions reductions using the following equation:

$$ER = 1,045 \text{ Mcf/year/well} * AF$$

Where,

ER = Emissions Reductions (Mcf/year)

AF = Activity Factor (wells producing with "smart" automation system)

Note: Emissions formula for plunger lift with Smart Automation System was used, because no formula was found for gas lift emissions.

References: Gas Well "Smart" Automation System PRO

[http://www.epa.gov/gasstar/documents/smart\\_automation.pdf](http://www.epa.gov/gasstar/documents/smart_automation.pdf)

Installing Plunger Lift Systems in Gas Wells Lessons Learned

[http://www.epa.gov/gasstar/documents/ll\\_plungerlift.pdf](http://www.epa.gov/gasstar/documents/ll_plungerlift.pdf)

#### **PRO-5: Eliminate Unnecessary Equipment or Systems**

**2009: 1 gas-fired engine decommission**

Emission reductions were calculated using the following equation:

$$ER = 2.11 \text{ Mcf methane/horsepower/year} * P * OP$$

Where,

ER = Methane emission reductions (Mcf/year) = 2.11 Mcf/HP/yr

P = Compressor power (horsepower) = 880 HP from 1 decommissioned engine

OP = Operating factor (%) i.e. the percentage of year the compressor is operational (assume 0.95)

#### **PRO-6 Directed Inspection & Maintenance at Fairway Field Facilities Tank Batteries**

**2009: 10 leaking tank hatches were identified. Replacement gaskets found to deteriorate quickly, resulting in leakage, so now replacing hatches into 2010. New hatches cost \$250 each plus \$50 labor. Assume only cost to replace hatches for 2009 STAR report.**

$$ER = EF * AF * XCH_4 * 70\% \text{ reduction on average through DI\&M}$$

Where,

ER = Emissions Reductions (Mcf/year)

EF = Emissions Reductions Factors (Mcf/year) = 82.80 MCF/yr natural gas per component\*

AF = Activity Factor (number of components)

XCH<sub>4</sub> = Mole fraction of methane in the gas (decimal) - default is 0.788 (Production)

\* Obtained from [epa.gov/gasstar/documents/xls/quantifying\\_nginx\\_methane\\_reductions.xls](http://epa.gov/gasstar/documents/xls/quantifying_nginx_methane_reductions.xls) in Worksheet "Other", DI&M at Remote Sites for Gas Plant/Non-compressor related